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ABSTRACT

This guide provides information on conducting a detailed program analysis using the New York State Program Evaluation Test in Science. The test consists of two required components (Objective Test and Manipulative Skills Test) and five optional components (Student Science Attitudes Survey; Student Science Program Environment Survey; Administrator Science Program Environment Survey; Teacher Science Program Environment Survey; and Parent/Guardian Science Program Environment Survey). Sections included are: (1) "Conducting a Program Analysis"; (2) "Organizing for Program Analysis"; (3) "Directions for Compiling Data" (describing how to use the worksheets, terms used, and the program strengths and weaknesses); (4) "Directions for Analyzing the Program Evaluation Test Data"; and (5) "Developing an Action Plan for Program Improvement." A simulated case study model for science program assessment and a set of worksheets are appended. (YP)

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NEW YORK STATE PROGRAM EVALUATION TEST IN SCIENCE

GUIDE TO PROGRAM EVALUATION K-4

The University of the State of New York
The State Education Department
Albany, New York 12234

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NEW YORK STATE
PROGRAM EVALUATION TEST IN SCIENCE

GUIDE TO
PROGRAM EVALUATION
K–4

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FOREWORD

The New York State Program Evaluation Test in Science consists of two required components and five optional components. These components are listed below.

Required Components

Objective Test	45 items
Content Section	(29 items)
Skills Section	(16 items)
Manipulative Skills Test	15 items

Optional Components

Student Science Attitudes Survey	20 items
Student Science Program Environment Survey	25 items
Administrator Science Program Environment Survey	32 items
Teacher Science Program Environment Survey	36 items
Parent/Guardian Science Program Environment Survey	12 items

This guide provides information on conducting a detailed program analysis using all seven components. The results of the two required components, as reported by the Department on the Comprehensive Assessment Report, can be considered as the most simple form of program analysis. We strongly recommend that you conduct a detailed program analysis using the two required components and as many of the optional components as possible.

The process of evaluating a program, as described in this guide, is not a process unique to science education. The compiling and analyzing of data from objective tests and from other tests and surveys can be done for any program area. Item analysis can provide the link from test to program, suggesting those local program areas where student performance may be weak and, therefore, may need specific attention.

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CONDUCTING A PROGRAM ANALYSIS

As defined in Part 100 of the Commissioner's Regulations, the purpose of a program evaluation test is to *assess the local instructional program* by means of written tests administered to students and other measurement techniques.

The seven components of the Program Evaluation Test in Science — two required and five optional — are designed to provide a means for you to conduct a detailed assessment of your local elementary science program. However, conducting this detailed assessment requires going beyond just collecting student scores. To maximize information about the quality of the program, you should compile and analyze individual test item data from the optional components as well as from the two required tests.

The underlying assumption of the optional components is that effective evaluation of your science program involves not only testing the achievement of students but also obtaining information about student attitudes toward science and about the elements of your science program that contribute to the program environment as perceived by students, administrators, teachers, and parents/guardians. Elements of the program environment include such things as your school's science program and its support for that program, instructional planning and instructional technique, and community and home support for the program. Although the program environment data are qualitative in nature, they can help to explain student performance on the required components of the test.

A high-quality science program requires commitment and diligence to develop and implement and also requires accurate feedback to refine and improve. By administering, scoring, compiling data on, and analyzing all seven components of the elementary science program evaluation, your school staff will have adequate feedback to identify general areas of strength and weakness in the elementary science program. You can then encourage and sustain areas of strength and address areas of weakness with an action plan for program improvement. Program evaluation is a time-consuming but worthwhile process.

Although only two components of the Program Evaluation Test in Science are required, all seven components should be administered. However, local conditions often constrain what can be accomplished. If it is not possible to administer and analyze all components, then compile and analyze data from the two required components and from those optional components that can be administered. It is also possible to administer different optional components in alternating years. Whenever a component is administered, your school's administrators and teaching staff should conduct the analysis of that component.

This process of program evaluation should not be considered a vehicle for teacher evaluation. The abilities of the individuals teaching the program, while important, are not the focus of this effort. To assure the cooperation of school staff in improving the program, you must maintain a continual awareness by all involved that the intent is only to assess the various aspects of the total elementary science program.

The responses to the optional science attitudes and program environment surveys are qualitative in nature. Do not make comparisons among students based on their responses to any of the items. Responses to program environment items must be carefully related to the conditions and standards in effect at the local level. In the same way, you should not draw comparisons among schools and districts based on these surveys.

To facilitate your program analysis, this guide provides a series of worksheets and step-by-step directions for analyzing the data and for developing an action plan for program improvement. The case study of a fictional elementary school in Appendix I illustrates how the worksheets can be used and the data analyzed to identify program strengths and weaknesses and to develop an action plan for improvement of the elementary science program.

ORGANIZING FOR PROGRAM ANALYSIS

We recommend that your building/district have an administrator for the Program Evaluation Test in Science (probably the elementary science mentor), who is trained to administer the seven components of the program evaluation test. We also recommend that your building/district have an elementary science committee to plan the administration of the program evaluation test and to undertake the following tasks:

- determining the desired responses for the items in the program environment surveys, if any of them will be used
- planning the scoring procedures for the test components administered (including a decision whether to hand score or machine score)
- planning the procedures to be used in compiling and analyzing data and in developing an action plan

To assist the committee in its planning for the analysis of the results of the program evaluation test, Appendix III provides a planning worksheet, Organizing for Program Analysis.

DIRECTIONS FOR COMPILING DATA

Using the Worksheets

To ease the task of compiling and displaying the data needed to conduct an analysis of the elementary science program, a set of worksheets has been provided in Appendix III. Please note that no one individual is expected to complete all the worksheets. In many schools/districts, the individual item data will be provided through machine scoring. The full set of worksheets does not need to be completed unless all of the test components administered must be hand scored. Even then, different staff are likely to complete different worksheets. The worksheets that tally item responses, of which there are five, are likely to be completed by a building staff member after the tests and surveys are scored. The remaining worksheets are likely to be completed by the Program Evaluation Test in Science administrator and/or the elementary science mentor. These worksheets simply aggregate data for a building and/or a district and summarize and display data in a form that facilitates program analysis.

Each worksheet includes directions for completing it. When all worksheets are completed, four of the worksheets are used as summary sheets in undertaking the program analysis.

The worksheets derive the following data for the various components of the Program Evaluation Test in Science.

Objective Test
- individual item difficulties
- an average difficulty for each part of the test

Manipulative Skills Test
- individual item difficulties (and student scores for the required Department report)

Student Science Attitudes and Science Program Environment Surveys
- individual item discrepancies
- aggregated item discrepancies for attitudinal areas in the syllabus and for program environment areas

Explanation of Terms Used in Compiling Data

Objective Test

The term "item difficulty," as used for the Objective Test items, is defined as the percentage of students who answer each test item correctly. For example, an item difficulty of 75 means that 75% of the students answered the test item correctly and 25% answered it incorrectly. The higher the item difficulty number, the larger the percentage of students who answered the item correctly.

To get an indication of whether your local science program is strong or weak for a particular test item in comparison with the entire State, compare your local item difficulty to the State overall group difficulty derived from the statewide field test. In addition, statewide item difficulties are reported for the lower half of the field test population and for the upper half. All the students who took the field test are ranked by their scores on the entire test and then divided into an upper group and a lower group. Separate item difficulties are derived for each group and provided as additional information to use in program evaluation.

The term "average difficulty" refers to the overall difficulty of each part of the test, which is obtained by averaging the difficulties of all items in a part of the test. By aggregating the individual item data in this way, the information provided becomes more reliable. Analyze your aggregated data first and rely on it the most. Individual item data can be of most help in zeroing in on possible reasons for any weaknesses identified in the aggregated data.

Manipulative Skills Test

The term "item difficulty," as used for the Manipulative Skills Test, refers to the degree to which the highest possible score for the item was obtained. It is the mean (or average) value of the scores for an item divided by the maximum score (expressed as a percent). For example, if an item difficulty is 50 for an item with a maximum score of 3 points, then the mean score on the item was 1.5 points.

Surveys

The term "item discrepancy," as used for the Student Science Attitudes and Science Program Environment Surveys, means the percentage of respondents for each item who do *not* match the desired response. For example, an item discrepancy of 35 means that 35% of the individuals responding to an item did *not* answer with the desired response.

The term "average discrepancy" refers to the overall discrepancy of each attitudinal or program environment area. The discrepancies of all items in an area are averaged. Again, this provides aggregated data, which are more reliable than individual item data.

Identifying Program Strengths and Weaknesses

After the Item Difficulty Summary Sheet worksheets are completed for the Objective Test and Manipulative Skills Test, put a box around the local difficulties that are at or below the State lower group difficulty to identify the items on which your students performed most poorly in comparison with the statewide field test results. Circle the items that are below the State overall group difficulty to identify the items on which the students performed more poorly than the field test population as a whole. The remaining items are those items that are at or above the State overall group difficulty.

We recommend that you also identify those items on which the students performed at or above the State overall group difficulty and above the upper group difficulty. These items are the "good news" and "very good news" about your elementary science program, the program strengths. (These directions are not included on the worksheets because of space limitations.)

After the Summary Sheet worksheets are completed for the Student Science Attitudes Survey and the Science Program Environment Surveys, circle those areas whose average discrepancy is more than 35, to identify the areas having the least agreement with the desired responses. For the Student Science Attitudes Survey, these are the areas most in need of program improvement. For the Science Program Environment Surveys, these are the program environment areas that may be causing poor student performance on the Objective Test, Manipulative Skills Test, and Student Science Attitudes Survey. The areas not circled are those where the respondents' answers most closely match the desired responses. These, also, are the "good news" about the program.

DIRECTIONS FOR ANALYZING THE PROGRAM EVALUATION TEST DATA

Objective Test

Materials Needed:
- Objective Test Worksheets 3 and 4
- Program Weaknesses Worksheet
- Program Strengths Worksheet

1. Look at Objective Test Worksheet 4. Do any of the local average difficulty numbers have a box around them? These are the content or skills areas of the syllabus in which students performed at or below the State lower group average and in which your students performed most poorly in comparison with the statewide field test results. These syllabus areas are most in need of improvement. List these areas of the syllabus on the Program Weaknesses Worksheet.

2. Do any of the numbers have a circle around them? These are the areas in which students performed below the State overall group average difficulty. In these areas your students have performed better than the areas enclosed by a box but still not as well as the State overall group average difficulty. These areas are also in need of improvement. List these areas of the syllabus on the Program Weaknesses Worksheet.

3. Are any of the numbers above the State overall group average difficulty or above the upper group average? These are the areas where your program is the strongest. List these areas of the syllabus on the Program Strengths Worksheet.

4. Look at Objective Test Worksheet 3 and mark the areas of weakness identified from Worksheet 4. For each area, list on the Program Weaknesses Worksheet the syllabus reference for each item whose difficulty has a box or a circle around it, using a small box or circle to key it. These syllabus references may point to specific content understandings and/or skills that are most problematic for your students.

Manipulative Skills Test

Materials Needed:
- Manipulative Skills Test Worksheet 3
- Program Weaknesses Worksheet
- Program Strengths Worksheet

1. Look at Manipulative Skills Test Worksheet 3. Do any of the local difficulty numbers have a box around them? These are the skills in the syllabus in which students performed at or below the State lower group difficulty and in which your students performed most poorly in comparison with the statewide field test results. These skills are most in need of improvement. List these skills on the Program Weaknesses Worksheet and underline any skill that you have already entered as a result of the Objective Test analysis.

2. Do any of the numbers have a circle around them? These are the skills where students performed below the State overall group difficulty. In these skills your students have performed better than the areas enclosed by a box but still not as well as the State overall group. These skills are also in need of improvement. List these skills on the Program Weaknesses Worksheet and underline any skill that you have already entered as a result of the Objective Test analysis.

3. Are any of the numbers above the State overall group difficulty or above the State upper group difficulty? These indicate the skills where your program is the strongest. List these skills on the Program Strengths Worksheet, and underline any skill that you have already entered as a result of the Objective Test analysis.

Student Science Attitudes Survey

Materials Needed:
- Student Science Attitudes Survey Worksheets 1 and 2
- Program Weaknesses Worksheet
- Program Strengths Worksheet

1. Look at Student Science Attitudes Survey Worksheet 2. Which of the attitudinal areas have discrepancies that are circled (show a discrepancy of more than 35)? These are the attitudinal areas in the syllabus where student responses show the least agreement with the desired response. These areas are most in need of improvement. List these attitudinal areas on the Program Weaknesses Worksheet.

2. Which numbers for the attitudinal areas are not circled? These indicate the attitudinal areas where your program is strongest. List these areas on the Program Strengths Worksheet.

3. Look at the individual test item discrepancies for each circled attitudinal area on Worksheet 2 and list the syllabus reference (from Worksheet 1) for each item that has a circle around it. These syllabus references may point to specific attitudes that need to be improved.

Analysis of Instructional Activities

Materials Needed:
- Program Strengths and Weaknesses Worksheets
- Appendix G of the *New York State Elementary Science Syllabus* completed for your elementary science program or the completed Program Correlation Charts (wall charts) for Levels I and II
- Highlighter marking pens (blue and red)

1. Look at the Program Strengths Worksheet. In Appendix G or on the wall charts, highlight each of the areas of *strength* in *blue*.

2. Look at the Program Weaknesses Worksheet. In Appendix G or on the wall charts, highlight each of the areas of *weakness* in *red*. Mark with a small square or a small circle each specific syllabus reference on the worksheet. (Note that not all content and skills for Levels I and II and not all attitudes appear as items on their respective tests. To include all of them would have made the testing period for students unduly long. Therefore, for understandings, skills, and attitudes not appearing on the tests, rely on locally administered instruments.)

3. Decide which syllabus areas you will concentrate on to improve your program. Scan across Appendix G (or the wall charts) to identify those instructional activities used to teach the weak learning outcomes. Analyze each instructional activity to see whether it actually accomplishes the outcome(s) intended, and, if it does not, determine how it could be modified or replaced to better achieve the intended outcome(s).

Science Program Environment Surveys

Materials Needed:
- Science Program Environment Worksheets 1–7
- Program Weaknesses Worksheet
- Program Strengths Worksheet
- Appendix II, Science Program Environment Assessment Model, in this guide
- Highlighter marking pen (red)

1. Look at the Program Environment Worksheet 7. Which program environment areas on the chart labeled "Summary by Program Environment Area" have numbers that are circled (show a discrepancy of more than 35)? These are the program environment areas where the responses across all groups

surveyed show the least agreement with the desired responses. These areas are most in need of program improvement. List these program environment areas on the Program Weaknesses Worksheet.

2. Also on Worksheet 7, look at the individual chart (School Science Program, Science Program Support, Instructional Planning, Instructional Technique, and Community/Home Support) for each weak program environment area. Within each area, for which groups (student, administrator, teacher, parent) are the numbers circled? On the Program Weaknesses Worksheet, list each group under its program environment area. These are the groups within each weak area that had the least agreement with the desired responses.

3. On the chart labeled "Summary by Program Environment Area" on Worksheet 7, which of the numbers for the program environment areas are not circled? These identify the program environment areas where your program is strongest. List these program environment areas on the Program Strengths Worksheet.

4. Look at the individual survey item discrepancies on Worksheets 2, 3, 4, and 6. Under the appropriate program environment area on the Program Weaknesses Worksheet, list the program environment reference for each item that has a circle around it.

5. Refer to Appendix II in this guide, the model for program environment assessment, and locate the description of each program environment area you have identified as weak on the Program Weaknesses Worksheet. Highlight these program environment areas. Notice that each program environment area has a list of indicators that describe the desired program state. Under each highlighted program environment area, highlight the indicators listed on the Program Weaknesses Worksheet.

6. The highlighted indicators in each program environment area are those that may not be at the desired program state. On the Program Weaknesses Worksheet, write out each indicator next to its reference number. Have your science committee discuss what these indicators reveal about your local elementary science program. If needed, refer to or collect additional data to help you decide which indicators are most likely to be causing poor student performance. In some cases, several items from the surveys may trace back to one indicator, which may serve to confirm that indicator as a possible cause of poor performance.

DEVELOPING AN ACTION PLAN FOR PROGRAM IMPROVEMENT

Using the information provided by the program analysis, the science committee should develop an action plan to improve the effectiveness of the school's or district's elementary science program. The Action Plan Worksheet in Appendix III can be used to develop the course of action to address program weaknesses. The science committee's recommendations can be entered on the worksheet by listing the stated weakness, the corrective action that is recommended, the staff member(s) responsible for implementing that action, the time line for implementation, the resources needed, and the criteria for measuring the success of the program change. As program changes are planned for Levels I and II, consider their implications for program improvement in Level III.

The action plan can be as streamlined or as detailed as the committee decides is best for the school/district. To be sure that staff are not trying to accomplish too much at once, the committee members may wish to rank the recommendations by greatest need or priority and, for the first year, work only on the highest ranked two or three. It is also important to develop an action plan that allows sufficient time and resources to carry out the actions properly.

Once the action plan has been developed by the science committee, present it to the district personnel responsible for budgeting, staff development, and other programmatic areas. These individuals may request that a presentation be made to the board of education (or the governing body of a nonpublic school) regarding the results of the program evaluation and the action plan.

The administrator of the Program Evaluation Test in Science and/or building/district elementary science mentor should then compile a final committee report on the program evaluation that lists the members of the committee, the areas of program strength and weakness, and the action plan for improving areas of weakness. Circulate this report to the superintendent, the building principal(s), the curriculum supervisor, the science supervisor, and the committee members. The report should also be shared with science teaching staff at the elementary level, but the method of doing so should be planned carefully to insure their support when the action plan is implemented.

Since developing an action plan does not insure its implementation, the building principal, the program evaluation test administrator, and/or the building/district mentor should monitor the progress of the action plan through administrative channels. That person may also need to serve as an advocate for the plan in meetings with other decision makers in order to obtain the necessary support and funding. When the action plan is approved and implementation begins, even more careful monitoring and trouble shooting will be required for insuring successful and lasting implementation and for evaluating whether program changes are actually resulting in an improved program.

Program evaluation data collected over several years will tell you much about whether your program is improving. Some key questions to ask as additional program evaluation tests are administered and analyzed are:

What areas of weakness persist over time and why?
What areas of weakness seem to be improving and why?
What new areas of weakness, if any, are emerging from new data and why?
What else does a comparison of data over time reveal?

Implementation of an action plan takes both time and considerable staff support and resources. It is unlikely that all needed program improvements can be implemented successfully in a single year. Do not expect spectacular improvements in all areas on the next program evaluation test. Instead, look for areas of even small improvement and give your action plan a chance to effect change over several years, making corrections as the program evaluation test results in succeeding years suggest them.

APPENDIX I

CASE STUDY: NEW DIRECTIONS ELEMENTARY SCHOOL

New Directions Elementary School is fictional, but the simulated case study carried out on it draws from actual data reported from Program Evaluation Test in Science field test schools.

Vital Statistics of New Directions Elementary School

Grade Levels	K – 6
Student Population	350
Other Elementary Schools in District	5
Setting	Medium-size city
No. of 4th Grade Classes	3
No. of 4th Grade Students Tested	57
No. of Teachers Surveyed	3
No. of Administrators Surveyed	1
No. of Parents Responding	36
Appointment of Elementary Science Mentor	October 1988
Establishment of Science Committee	May 1989

Compiled program evaluation test data are provided on the case study worksheets on the following pages. Only summary sheets for these data are shown. In this case study, an asterisk(*) was used to indicate those items on which the students performed at or above the upper group difficulty.

WORKSHEET 3

ITEM NO.	SYLLABUS REFERENCE	LOCAL DIFFICULTY	STATE DIFFICULTY		
			LOWER GROUP	TOTAL	UPPER GROUP
1	IA2.11	(92)	88	93	98
2	IA1.3	(62)	51	64	78
3	IA1.12	[16]	40	47	54
4	IA2.16	(57)	51	64	77
5	IA2.2	[57]	57	70	84
6	IA2.3	[70]	72	82	92
7	IA2.41	(41)	34	47	60
8	IA2.6	[05]	33	40	48
9	IB2	73	44	66	87
10	IC1.11	[60]	66	75	85
11	IC1.3	(73)	66	78	91
12	IC2.5	(49)	42	57	71
13	ID1	92	81	89	97
14	ID2.2	(62)	57	72	88
15	IIA1.21	*57	32	40	48
16	ID3.12	46	22	36	51
17	ID3.2	60	49	59	69
18	ID1.2	(68)	60	73	85
19	IIA1.22	(27)	24	42	60
20	IIA1.23	(76)	67	79	91
21	IIA2.41	[22]	24	36	48
22	IIA2.1	[65]	67	80	93
23	IIB1.1	(43)	32	46	60
24	IIB1	(73)	59	74	89
25	IIB1.2	51	33	46	59
26	IIB2.1	(35)	25	41	56
27	IIC2.2	(62)	52	67	82
28	IIC1.12	(35)	31	43	56
29	IIB2.1	[51]	51	68	85
30	Classifying - I	(81)	80	87	94
31	Measuring - I	(49)	30	52	73
32	Interp Data - I	84	77	87	96
33	Interp Data - I	70	39	57	75
34	Using Numbers - I	78	44	63	82
35	Observing - I	(70)	60	75	90
36	Measuring - I	95	86	92	98
37	Using Cues - II	[59]	69	81	94
38	Using Numbers - II	[49]	57	69	80
39	Measuring - II	(51)	49	65	81
40	Dev Vocab - II	[27]	38	56	74
41	Ident Var - II	[27]	36	49	61
42	Rec Data - II	65	37	59	81
43	Rec Data - II	[16]	30	45	60
44	Questioning - II	[24]	24	45	66
45	Interp Data - II	(38)	35	54	73

OBJECTIVE TEST WORKSHEET 4

BUILDING/DISTRICT NAME New Directions

SUMMARY SHEET
TEST PART DIFFICULTY

DIRECTIONS:

1. From Objective Test Worksheet 3, total the local difficulty of the items in each test part and place in the total column.
2. Determine the local average difficulty for each part of the Objective Test.
   (Total ÷ number of items in the part)
3. Put a box around each average difficulty that is at or below the State lower group average difficulty.
4. Circle each average difficulty that is below the State overall group average difficulty.

TEST PART (ITEM NOS.)	TOTAL	DIVIDE BY	LOCAL AVERAGE DIFFICULTY	STATE AVERAGE DIFFICULTY		
				LOWER GROUP	OVERALL GROUP	UPPER GROUP
LEVEL I CONTENT (1–14,16–18)	983	17	(58)	54	65	77
LEVEL II CONTENT (15,19–29)	597	12	(50)	41	55	69
LEVEL I SKILLS (30–36)	527	7	75	59	73	87
LEVEL II SKILLS (37–45)	356	9	[40]	42	58	74
TOTAL (1–45)	2,463	45	(55)	49	62	76

MANIPULATIVE SKILLS TEST
WORKSHEET 3

BUILDING/DISTRICT NAME New Directions

SUMMARY SHEET
ITEM DIFFICULTY

DIRECTIONS:

1. From Manipulative Skills Test Worksheet 2, record the item difficulty for each item in the local difficulty column.
2. Put a box around each local difficulty that is at or below the State lower group item difficulty.
3. Circle each local difficulty that is below the State overall group item difficulty.

STATION	ITEM NO.	SYLLABUS REFERENCE	LOCAL DIFFICULTY	STATE ITEM DIFFICULTY		
				LOWER GROUP	OVERALL GROUP	UPPER GROUP
1	2	MEASURING MASS	* 82	40	62	82
	3	MEASURING LENGTH	(65)	61	72	84
	4	MEASURING VOLUME	57	29	46	65
	5	MEASURING TEMPERATURE	[70]	76	83	90
2	1	OBSERVING	(77)	66	79	93
	2	PREDICTING	(57)	36	58	80
	3	INTERPRETING DATA	41	19	39	57
3	1	CLASSIFYING	(59)	54	66	84
	2	CLASSIFYING	62	46	60	78
4	2	MANIPULATING MATERIALS	91	81	87	92
	3	GENERALIZING	[30]	---	46 †	---
5	1	INFERRING	(24)	21	35	49
	2	INFERRING	65	54	62	75
	3	INFERRING	(30)	28	38	49
	5	INTERPRETING DATA	[35]	---	74 †	---

†This difficulty is based on a re-pretested sample of 78 students. The values for the lower and upper groups are not available.

STUDENT SCIENCE ATTITUDES SURVEY **BUILDING/DISTRICT NAME** New Directions
WORKSHEET 2

SUMMARY SHEET

DIRECTIONS:

1. From Student Science Attitudes Survey Worksheet 1 for each class, record the number of completed surveys and the number of responses not matching the State-defined desired response for each item.
2. Total the vertical column for the number of completed surveys and for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Transfer each item discrepancy to the correct box on the Summary Chart at the bottom.
5. Determine the average discrepancy for each attitude area by completing the Summary Chart.
6. Circle each discrepancy on both charts that is greater than 35 (more than 35% of the student responses do not correspond with the desired response).

CLASS	NO. OF COMPLETED SURVEYS	FOR EACH ITEM, NO. OF RESPONSES NOT MATCHING DESIRED RESPONSE																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	20	5	1	3	4	13	4	2	5	1	9	14	11	10	6	11	6	7	8	12	10
2	16	7	2	2	2	12	7	4	7	4	7	13	7	9	13	13	11	7	10	11	11
3	18	2	1	2	2	13	4	2	8	0	5	16	7	6	6	13	4	10	7	10	6
4																					
5																					
6																					
7																					
8																					
9																					
10																					
TOTAL	54	14	4	7	8	38	15	8	20	5	21	43	25	25	25	37	21	24	25	33	27
ITEM DISCREPANCY		26	7	13	15	(70)	28	15	(37)	9	(39)	(80)	(46)	(46)	(46)	(69)	(39)	(44)	(46)	(61)	(50)

SUMMARY CHART BY ATTITUDE AREA

ATTITUDE AREA		ITEM NUMBERS/DISCREPANCY										TOTAL DISC.	DIVIDED BY	AVERAGE DISC.
UNDERSTANDING NATURAL WORLD	A1	1	2	3	11	12						172	5	34
		26	7	13	(80)	(46)								
INVESTIGATIVE METHODS	A2	4	5	6	7	13	14	15	16	17	18	418	10	(42)
		15	(70)	28	15	(46)	(46)	(69)	(39)	(44)	(46)			
VALUING KNOWLEDGE	B	8	9	10	19	20						196	5	(39)
		(37)	9	(39)	(61)	(50)								

STUDENT PROGRAM ENVIRONMENT SURVEY WORKSHEET 2

BUILDING/DISTRICT NAME New Directions

SUMMARY SHEET

DIRECTIONS:

1. From Student Program Environment Survey Worksheet 1 for each class, record the number of completed surveys and the number of students not matching the desired response for each item.
2. Total the vertical column for the number of completed surveys and for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Subtotal the item discrepancies for each program environment area.
5. Circle each discrepancy that is greater than 35 (more than 35% of the student responses do not match the desired response).
6. Transfer the subtotals to Program Environment Worksheet 7.

CLASS	NO. OF SURVEYS	FOR EACH ITEM, NO. OF RESPONSES NOT MATCHING DESIRED RESPONSE																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	18	8	12	2	1	5	3	1	0	1	2	1	0	3	0	0	3	3	7	11	2	1	7	0	2	5
2	19	8	6	1	19	2	3	19	3	5	2	0	2	0	0	1	4	3	3	9	3	1	13	11	6	2
3	20	10	17	5	18	6	2	20	10	14	10	2	1	2	2	1	5	14	8	14	2	10	14	15	10	3
4																										
5																										
6																										
7																										
8																										
9																										
10																										
TOTAL	57	26	35	8	38	13	8	40	13	20	14	3	3	5	2	2	12	20	18	34	7	12	34	26	18	10
ITEM DISCREPANCY		(46)	(61)	14	(67)	23	14	(70)	23	35	25	5	5	9	4	4	21	35	32	(60)	12	21	(60)	(46)	32	18
ITEM NOS.								1–8																9–24		25
SUBTOTAL								318																406		18

ADMINISTRATOR PROGRAM ENVIRONMENT SURVEY WORKSHEET 3

BUILDING/DISTRICT NAME New Directions

BUILDING OR DISTRICT WORKSHEET

DIRECTIONS:

1. Record the desired local response for each item in the appropriate column.
2. Record the number of completed administrator surveys and the number of responses not matching the desired response for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Subtotal the item discrepancies for each program environment area.
5. Circle each item discrepancy that is greater than 35.
6. Transfer the subtotals to Program Environment Worksheet 7.

TOTAL NO. OF COMPLETED SURVEYS 1

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	DESIRED RESPONSE	NO. NOT MATCHING DESIRED RESPONSE	ITEM DISC.
1	Sch.Sci.Prg. 5.4	A	0	0
2	Sch.Sci.Prg. 5.2	A	0	0
3	Sch.Sci.Prg. 5.2	A	0	0
4	Sch.Sci.Prg. 5.1	A	0	0
5	Sch.Sci.Prg. 5.5	A	1	(100)
		SUBTOTAL 1–5		100
6	Prg. Support 4.1	A	1	(100)
7	Prg. Support 4.2	A	0	0
8	Prg. Support 4.5	A	0	0
9	Prg. Support 4.5	A	0	0
10	Prg. Support 4.2	A	0	0
11	Prg. Support 4.2	A	0	0
12	Prg. Support 4.5	A	0	0
13	Prg. Support 4.5	A	0	0
14	Prg. Support 4.2	A	1	(100)
15	Prg. Support 4.2	A	0	0
16	Prg. Support 4.3	A	0	0
		SUBTOTAL 6–16		200

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	DESIRED RESPONSE	NO. NOT MATCHING DESIRED RESPONSE	ITEM DISC.
17	Instr. Plan. 7.1	A	0	0
18	Instr. Plan. 7.2	A	1	(100)
19	Instr. Plan. 7.3	A	0	0
20	Instr. Plan. 7.2	A	0	0
21	Instr. Plan. 7.2	A	0	0
22	Instr. Plan. 7.3	A	0	0
23	Instr. Plan. 7.7	A	0	0
24	Instr. Plan. 7.5	A	0	0
25	Instr. Plan. 7.5	A	0	0
26	Instr. Plan. 7.5	A	0	0
27	Instr. Plan. 7.3	A	0	0
28	Instr. Plan. 7.7	A	0	0
29	Instr. Plan. 7.7	A	1	(100)
		SUBTOTAL 17–29		200
30	Instr. Tech. 6.6	A	1	(100)
31	Instr. Tech. 6.5	A	0	0
32	Instr. Tech. 6.5	A	0	0
		SUBTOTAL 30–32		100

TEACHER PROGRAM ENVIRONMENT SURVEY WORKSHEET 4

BUILDING/DISTRICT NAME New Directions

BUILDING OR DISTRICT WORKSHEET

DIRECTIONS:

1. Record the desired local response for each item in the appropriate column.
2. Record the number of completed teacher surveys and the number of responses not matching the desired response for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Subtotal the item discrepancies for each program environment area.
5. Circle each discrepancy that is greater than 35.
6. Transfer the subtotals to Program Environment Worksheet 7.

TOTAL NO. OF COMPLETED SURVEYS 3

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	DESIRED RESPONSE	NO. NOT MATCHING DESIRED RESPONSE	ITEM DISC.
1	Sch.Sci.Prg. 5.4	A	3	(100)
2	Sch.Sci.Prg. 5.2	A	2	(67)
3	Sch.Sci.Prg. 5.2	A	3	(100)
4	Sch.Sci.Prg. 5.1	A	0	0
5	Sch.Sci.Prg. 5.5	A	3	(100)
			SUBTOTAL 1–5	367
6	Prg. Supp. 4.1	A	3	(100)
7	Prg. Supp. 4.5	A	1	33
8	Prg. Supp. 4.2	A	0	0
9	Prg. Supp. 4.2	A	2	(67)
10	Prg. Supp. 4.2	A	1	33
11	Prg. Supp. 4.5	A	1	33
12	Prg. Supp. 4.2	A	2	(67)
13	Prg. Supp. 4.5	A	0	0
14	Prg. Supp. 4.5	A	1	33
15	Prg. Supp. 4.5	A	1	33
16	Prg. Supp. 4.5	A	0	0
17	Prg. Supp. 4.5	A	2	(67)
18	Prg. Supp. 4.5	A	1	33
19	Prg. Supp. 4.2	A	1	33
20	Prg. Supp. 4.2	A	3	(100)
			SUBTOTAL 6–20	632

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	DESIRED RESPONSE	NO. NOT MATCHING DESIRED RESPONSE	ITEM DISC.
21	Instr. Plan. 7.1	A	2	(67)
22	Instr. Plan. 7.2	A	1	33
23	Instr. Plan. 7.3	A	0	0
24	Instr. Plan. 7.2	A	0	0
25	Instr. Plan. 7.3	A	0	0
26	Instr. Plan. 7.7	A	2	(67)
27	Instr. Plan. 7.5	A	0	0
28	Instr. Plan. 7.6	A	0	0
29	Instr. Plan. 7.3	A	2	(67)
30	Instr. Plan. 7.7	A	1	33
			SUBTOTAL 21–30	267
31	Instr. Tech. 6.4	A	1	33
32	Instr. Tech. 6.4	A	3	(100)
33	Instr. Tech. 6.5	A	1	33
34	Instr. Tech. 6.6	A	3	(100)
35	Instr. Tech. 6.5	A	3	(100)
36	Instr. Tech. 6.5	A	2	(67)
			SUBTOTAL 31–36	433

PARENT/GUARDIAN PROGRAM ENVIRONMENT SURVEY
WORKSHEET 6

BUILDING/DISTRICT NAME New Directions

SUMMARY SHEET

DIRECTIONS:

1. From Parent/Guardian Program Environment Survey Worksheet 5 for each class, record the number of returned surveys and the number of responses not matching the desired response for each item.
2. Total the vertical column for the number of surveys and for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Subtotal the item discrepancies for each program environment area.
5. Circle each discrepancy that is greater than 35.
6. Transfer the subtotals to Program Environment Worksheet 7.

CLASS	NO. OF SURVEYS	FOR EACH ITEM, NO. OF RESPONSES NOT MATCHING DESIRED RESPONSE											
		1	2	3	4	5	6	7	8	9	10	11	12
1	11	5	5	3	10	2	4	1	6	5	4	3	5
2	11	7	5	6	11	7	3	4	7	7	6	6	4
3	14	7	5	5	4	4	1	2	5	5	5	2	4
4													
5													
6													
7													
8													
9													
10													
TOTAL	36	19	15	14	25	13	8	7	18	17	15	11	13
ITEM DISCREPANCY		(53)	(42)	(39)	(69)	(36)	22	19	(50)	(47)	(42)	31	(36)
ITEM NOS.		1				2–5				6–10		11–12	
SUBTOTAL		53				186				180		67	

PROGRAM ENVIRONMENT WORKSHEET 7

BUILDING/DISTRICT NAME New Directions

SUMMARY SHEET

DIRECTIONS:

1. From each program environment survey summary sheet (Worksheets 2, 3, 4, and 6), record the item subtotals in the appropriate spaces.
2. To determine the average discrepancy for each program area by group surveyed, complete the horizontal rows in the first five charts.
3. To determine the overall average discrepancy for each program area, complete the vertical "Subtotal" column and the "Total" horizontal row in each of the first five charts. For easy reference, transfer the overall average discrepancy to the last chart.
4. Circle each discrepancy that is greater than 35.

SCHOOL SCIENCE PROGRAM

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT				
ADMINISTRATOR	1–5	100	5	*20
TEACHER	1–5	367	5	(73)
PARENT/GUARD.	1	53	1	(53)
TOTAL		520	11	(47)

SCIENCE PROGRAM SUPPORT

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT				
ADMINISTRATOR	6–16	200	11	*18
TEACHER	6–20	632	15	(42)
PARENT/GUARD.				
TOTAL		832	26	*32

INSTRUCTIONAL PLANNING

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT	1–8	318	8	(40)
ADMINISTRATOR	17–29	200	13	*15
TEACHER	21–30	267	10	*27
PARENT/GUARD.	2–5	186	4	(47)
TOTAL		971	35	*28

INSTRUCTIONAL TECHNIQUE

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT	9–24	406	16	*25
ADMINISTRATOR	30–32	100	3	*33
TEACHER	31–36	433	6	(72)
PARENT/GUARD.	6–10	180	5	(36)
TOTAL		1,119	30	(37)

COMMUNITY/HOME SUPPORT

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT	25	18	1	*18
ADMINISTRATOR				
TEACHER				
PARENT/GUARD.	11–12	67	2	*33
TOTAL		85	3	*28

SUMMARY BY PROGRAM ENVIRONMENT AREA

PROGRAM ENVIRONMENT REFERENCE	OVER-ALL DISC.
SCHOOL SCIENCE PROGRAM	(47)
SCIENCE PROGRAM SUPPORT	*32
INSTRUCTIONAL PLANNING	*28
INSTRUCTIONAL TECHNIQUE	(37)
COMMUNITY/HOME SUPPORT	*28

Analysis of Results

Program Weaknesses

As shown on the completed Program Weaknesses Worksheet, the Objective Test as a whole fell below the State overall group difficulty. Level II Skills are a serious area of concern, with student performance below the State lower group difficulty. Also of concern are the Levels I and II Content, which are below the State overall group difficulty.

The Manipulative Skills Test results showed nine of 15 items below the State overall group item difficulty, with three of those items below the lower group difficulty. The Student Science Attitudes Survey results showed the areas Investigative Methods and Valuing the Use of Knowledge for Society to be areas of concern.

Since the general area of skills appeared as a weakness on all three instruments, including Investigative Methods on the Attitudes Survey, particular attention should be paid in the action plan to improving the program in the area of skills, especially those in Level II. It appears that, while the Level I Skills were mastered, they were not built on in Level II. Also, since the Objective Test Level I Content, Level II Content, and the total test results were below the State overall group, attention in the action plan also should be paid to these areas.

In the Science Program Environment Surveys, the school science program is the area of most concern (discrepancy of 47), with instructional technique the next most serious area of concern (discrepancy of 37). In general, parents and teachers showed the most concern for the overall science program environment, while students and the lone administrator indicated that the overall science program environment was not an area of concern.

An analysis of the individual indicators in the school science program area that were not at the desired state pointed to the following problem areas:

- The program does not accurately reflect the State syllabus.
- The program is not readily available to teachers in an understandable form.
- The program is not being reviewed periodically, with revisions being made as needed.

Likewise, an analysis of the individual indicators in the instructional technique area that were not at the desired state pointed to the following problem areas:

- There is little encouragement of student effort.
- Adequate instructional materials are not readily available and/or frequently used.

These weak program environment areas — school science program and instructional technique — are particularly significant in pointing to the possible causes of poor student performance on the Objective Test, Manipulative Skills Test, and Student Science Attitudes Survey. If, indeed, the local school program does not reflect the State syllabus, then it would be expected that students would perform poorly on these three tests, even when instructional planning did not show up as a weak area. Coupled with a local program document that is not readily available to teachers and no review and revision of the local program, it is understandable that student performance is weak.

Likewise, the analysis of the individual indicators in the instructional technique area shows the possible reasons for poor performance in the skills area, particularly on the Manipulative Skills Test. It appears that manipulative or "hands-on" materials are either not readily available to or not used by teachers, a critical weakness where skills are concerned. This is confirmed by an item on the teacher survey, where two of the three teachers indicated that they disagreed with the statement that their science instruction included a wide variety of hands-on activities such as laboratory and field investigations.

The other indicator in the instructional technique area that was not at the desired state concerned encouragement of student effort. It appears that parents are not kept informed about student progress in science or class science activities nor are students being recognized for their class effort and science achievement.

Program Strengths

As shown on the completed Program Strengths Worksheet, the Objective Test showed no areas of program strength. The Manipulative Skills Test indicated that the skill of measuring mass was above the State upper group difficulty.

The Student Science Attitudes Survey showed that the attitudinal area Understanding the Natural World was a program strength, and the Science Program Environment Surveys showed the following strong areas: support for the school science program, instructional planning, and support from home and community.

ELEMENTARY SCIENCE
PROGRAM WEAKNESSES WORKSHEET

OBJECTIVE TEST
AREAS OF WEAKNESS

SYLLABUS REFERENCE FOR INDIVIDUAL ITEMS

☐ *Inquiry Skills Level II*

☐ Using cues, using numbers, developing vocabulary, recording data, identifying variables

◯ Measuring, questioning, observing

◯ *Level I Content*
Level II Content
Total Test

☐ IA1.12,2.2,2.3,2.6; IC1.11

◯ IA1.3,2.11,2.16,2.41; IC1.3,2.5; ID1.2,2.2

☐ IIA2.1,2.41; IIB2.1

◯ IIA1.22,1.23; IIB1,1.1,2.1; IIC1.12,2.2

MANIPULATIVE SKILLS TEST
AREAS OF WEAKNESS

☐ *Measuring Temperature*
Generalizing
Interpreting Data

◯ *Measuring Length*
Observing
Predicting
Classifying
Inferring

SCIENCE ATTITUDES SURVEY
AREAS OF WEAKNESS

SYLLABUS REFERENCE FOR INDIVIDUAL ITEMS

◯ *Investigative Methods*

Skepticism, investigation, reasoning
Respecting others, environment

Valuing Knowledge

The practical, technical
Service through technology

PROGRAM ENVIRONMENT SURVEYS
AREAS OF WEAKNESS

POSSIBLE CAUSES OF POOR PERFORMANCE

◯ *School Science Program*
Parents, Teachers
5.1, 5.4, 5.5

Program does not reflect syllabus.
Program is not periodically reviewed and revised.
Program is not readily available to teachers in an understandable form.

Instructional Technique
Parents, Teachers
6.6 (5 discrepancies), 6.5

Student effort is not encouraged.
Adequate supply of instructional materials is not readily available and/or used.

ELEMENTARY SCIENCE
PROGRAM STRENGTHS WORKSHEET

OBJECTIVE TEST
AREAS OF STRENGTH

Inquiry Skills Level I

MANIPULATIVE SKILLS TEST
AREAS OF STRENGTH

Measuring Mass
Measuring Volume
Manipulating Materials

SCIENCE ATTITUDES SURVEY
AREAS OF STRENGTH

Understanding Natural World

Appreciating natural world	Respecting life
	Wanting to know, understand

PROGRAM ENVIRONMENT SURVEYS
AREAS OF STRENGTH

School Science Program Support	
Administrators	Administrators promote staff development in science.
4.2, 4.5	Administrators provide sufficient instructional materials and media
Instructional Planning	
Administrators	Plans include role of women & minorities in science; safety; career opportunities
Teachers	Activities provide opportunities for science problem solving
7.2, 7.3, 7.5	Assessment activities are carried out
Community/Home Support	
Students, Parents, 8.3	There is home access to science experiences.

Action Plan

As shown on the completed Action Plan Worksheet, the results of the elementary science program analysis point clearly to the tasks to be undertaken as part of the action plan for program improvement. The science committee, which was established in May 1989 to review the results of the program evaluation test, realized immediately that the root problem to be addressed is the lack of correlation between the local science program and the State elementary science syllabus.

This lack of correlation was not unexpected; there was no elementary science mentor in the school until the regional training workshops for the program evaluation test were announced in October 1988. A correlation between the existing science program and the State syllabus (using Appendix G of the Program Correlation Charts) had never been undertaken. The science committee recommended that this correlation be done first so that it would form the backbone of the action plan.

After performing the correlation between the local science program and the State syllabus, the action plan recommended that existing science units be revised and that new units and activities be developed as needed. This program development effort will focus mainly on the skills and science attitudes areas in the first year, as these were the greatest weaknesses in student performance. (In the following year, the program development effort will focus on Levels I and II Content.)

As the summer curriculum writing committee works on the tasks described above, it will also inventory existing materials, especially "hands-on" materials for the skills area, and will identify and recommend materials that need to be purchased. The science committee will identify a procedure for ordering new and replacement "hands-on" materials to insure efficiency in getting materials to teachers. Once new activities are developed and materials purchased, the elementary science mentor will train teachers to use them.

To address the remaining weakness identified in the area of instructional technique, the science committee will identify ways to encourage student effort in science and will develop a schoolwide plan to accomplish this. The committee will seek parent input as part of this effort.

A related effort to communicate more effectively with parents also is recommended. The committee noted that only 63% of parents returned their surveys and that the parents' responses differed from the desired responses to a greater extent than those of any other group surveyed. This could indicate that parents are uninformed about the school's science program. The committee will work with the principal to develop a plan to improve communication with parents.

ACTION PLAN
FOR PROGRAM IMPROVEMENT

PROGRAM WEAKNESS	CORRECTIVE ACTION	TIME LINE	PERSON(S) RESPONSIBLE	RESOURCES NEEDED	SUCCESS MEASURED BY
OBJECTIVE TEST Inquiry Skills Level II MANIPULATIVE SKILLS TEST 8 skills	Correlate program to syllabus	Summer '89	Summer Curriculum Writing Committee	Funds for summer committee	Correlation charts completed
	Revise/develop new manipulative and inquiry activities as needed	Summer '89		State syllabus, supplements, other science resources	Revised/new program activities to be tried in classrooms
	Inventory existing materials, identify needed materials and request purchase	Summer '89		Budget for materials	List of needed materials for purchase
	Train teachers to use	Fall '89	Elementary Science Mentor	Released time for training next year	Use of new/revised activities in classroom
NOTE: CONTENT AREA WEAKNESSES WILL BE ADDRESSED NEXT YEAR.					
SCIENCE ATTITUDES SURVEY Investigative Methods Valuing Knowledge	Correlate program to syllabus	Summer '89	Summer Curriculum Writing Committee	Funds for summer and fall work	Correlation charts completed
	Build attitude lessons into existing activities or develop new activities as needed. Try to connect to new inquiry activities.	Fall'89	Elementary Science Mentor and two or three teachers	State syllabus, supplements, other science resources	New program activities to be tried in classrooms
	Train teachers to use	Winter '89	Elementary Science Mentor	Accomplished during regular faculty meetings	Use of new/revised activities in classrooms

ACTION PLAN
FOR PROGRAM IMPROVEMENT

PROGRAM WEAKNESS	CORRECTIVE ACTION	TIME LINE	PERSON(S) RESPONSIBLE	RESOURCES NEEDED	SUCCESS MEASURED BY
PROGRAM ENVIRONMENT SURVEYS *School Science Program* Lack of correlation of program to syllabus; no provision for program review/revision; program not readily available to teachers	Corrective action on these weaknesses has been undertaken as part of the corrective action for the weaknesses identified on page 1 of the action plan.				
Instructional Technique Adequate instructional materials are not readily available and/or not frequently used	Corrective action on these weaknesses has been undertaken as part of the corrective action for the weaknesses identified on page 1 of the action plan.				
Student effort not encouraged	Identify ways to encourage student effort	Fall '89	Science Committee	None	Occurrence of schoolwide activities
Large number of discrepancies from parent/guardian surveys	Communicate more effectively with parents/guardians; involve them in planning for improvement	'89-'90 school year	Science Committee, Principal	Printing (?)	Information provided to parents/guardians (how much, when, why) Parent/guardian involvement in program improvement efforts

APPENDIX II

MODEL FOR SCIENCE PROGRAM ENVIRONMENT ASSESSMENT

The effective development and implementation of a high-quality science program requires that the persons involved with it be diligent and committed. Such a program also requires accurate feedback to refine it and improve it. The feedback obtained from the two required components of the test and one optional Student Science Attitudes Survey reveal the degree to which the local elementary science program is meeting desired learning outcomes. This feedback is certainly necessary but seldom sufficient to identify those program areas that are working and those that need attention.

The purpose of the four optional State elementary science Program Environment Surveys, which schools are encouraged to use, is to provide enough program feedback information to identify the general areas of strength and weakness in a school or district elementary science program. That feedback can then be used to confirm and reinforce strengths as well as to identify underlying weaknesses, so that encouragement and required changes can be properly directed.

The Program Environment Assessment Model

The development of the Program Environment Surveys was guided by a general model that focuses on the areas influencing student learning, including actions of administrators, teachers, parents, and students. A summary of the model is presented in Figure 1. The overall model consists of eleven major areas, which are numbered.

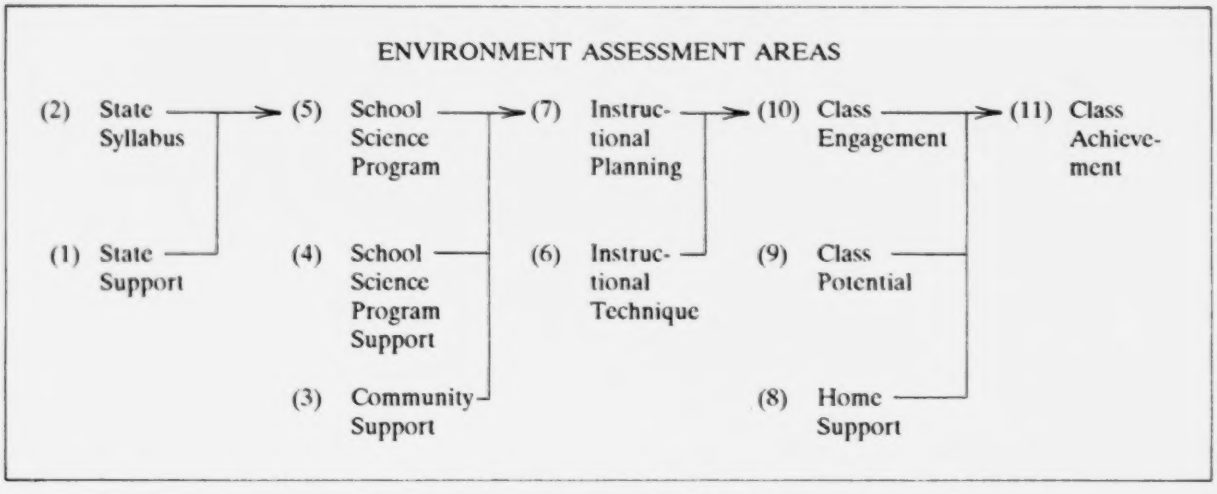

Figure 1: Science Program Environment Assessment Model Summary

General Features of the Model

The areas in the top row of the model (Areas 2, 5, 7, 10, and 11) portray the cumulative process of improving student learning in science commencing with the *New York State Elementary Science Syllabus* (Area 2). The syllabus is translated at the local level into a local school science program (Area 5), from which teachers select and/or design their instructional activities (Area 7). The activities, when used in the classroom, engage students in learning experiences (Area 10) which, if successful, result in student achievement of learning outcomes (Area 11) consistent with State objectives.

The success of this *cumulative* chain of events in meeting the original State goals is dependent along the way on the quality of support provided by the community (Area 3), the school administrative support (Area 4), the instruction provided by the teacher (Area 6), home support (Area 8), and the learning

potential of the class (Area 9). The number assigned each area gives a rough indication of its level of influence on student learning. A higher number indicates a more critical influence.

The State Program Environment Surveys concentrate on gathering information with respect to the middle areas (3–10). The two required tests (Objective and Manipulative Skills) and the optional student survey (Student Science Attitudes) measure class achievement (Area 11).

By completing the optional Program Environment Surveys, administrators, teachers, parents, and students each supply feedback on several areas, providing information on each area from more than one person and from more than one perspective. For each area, those who are most likely to influence or be influenced by that program area are asked for their assessment of it. Figure 2 shows a detailed version of the model, associating the areas with the groups that should be surveyed for that area. Note the overlapping sources of information for each area and the clusters of areas for which each person can be asked to provide data.

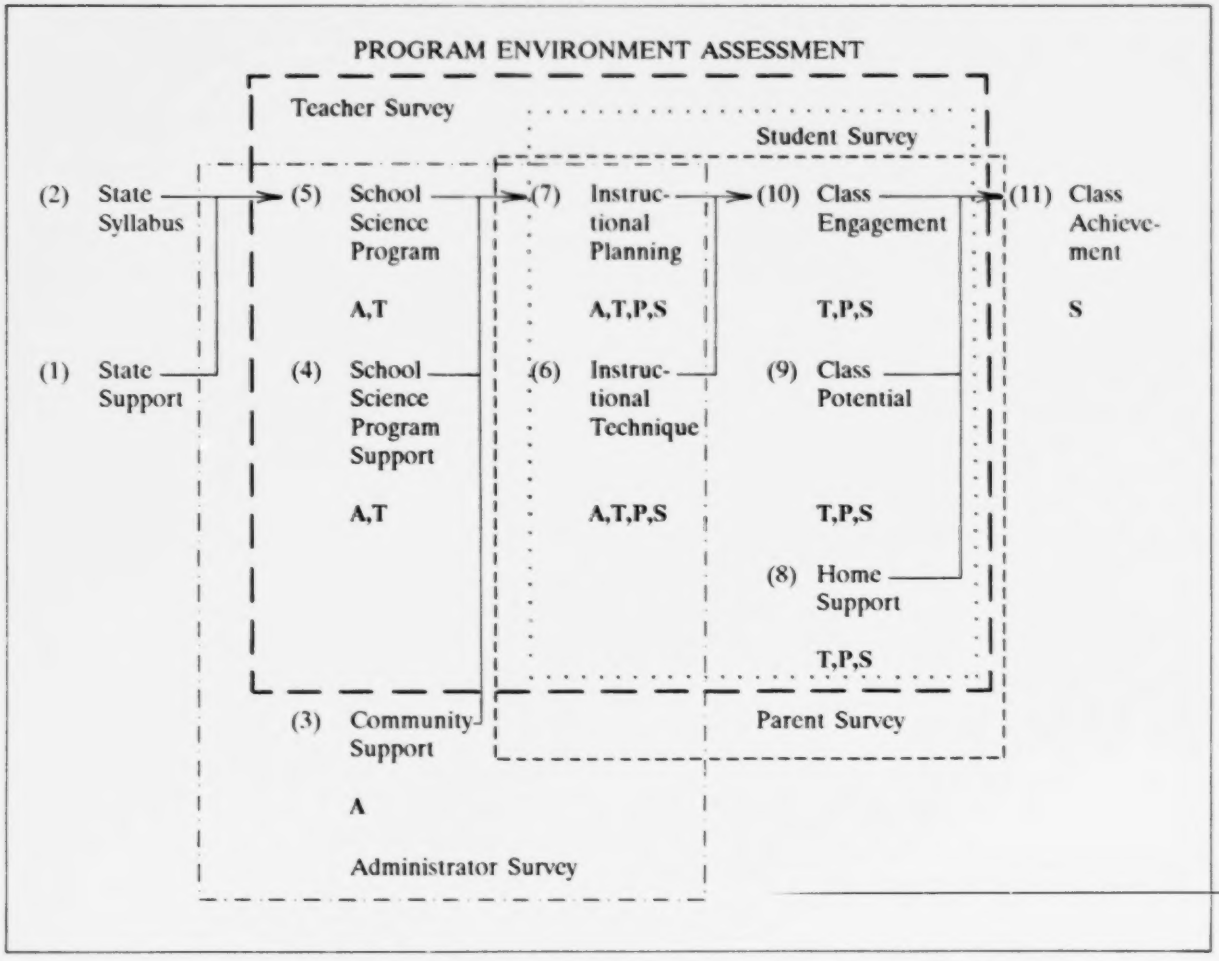

Figure 2: Comprehensive Model for Assessing Environmental Areas That Might Affect Class Achievement Outcomes of the *New York State Elementary Science Syllabus*

KEY:

A = can be assessed by the building administrator
P = can be assessed by parents/guardians
T = can be assessed by classroom teachers
S = can be assessed by students

Using the Program Environment Assessment Model

After data are compiled, the model can be used to search for the source of a particular problem. Start at the right side of the model, Area 11, and proceed to the left while examining results from the respective instruments. The results are expressed in the form of discrepancies. Discrepancies are either differences between State-defined standards and actual student achievement on the two required tests (Objective Test and Manipulative Skills Test) and one optional Student Science Attitudes Survey, or between locally defined standards and actual responses of persons surveyed on the four Program Environment Surveys. As you move to the left, area by area, look for the area farthest to the right, where satisfaction is high (no discrepancies). For example, if you have some dissatisfaction with student achievement, Area 11, based on results on the program evaluation test or any other test, look first at Class Engagement, Area 10, and Class Potential, Area 9. If your search of these areas fails to reveal shortcomings, it is unlikely that major deficiencies exist in the areas to the left of Areas 9 and 10. The source of the difficulty may, in fact, be in Area 11. However, if these areas (9 and 10) are not satisfactory, then the source of the difficulty may be in Areas 5–7, and you should examine these next. This right-to-left search reveals the root cause of a problem as being to the right of areas where high satisfaction is first encountered. Of course, changes may be called for all along the cumulative chain, and each of these areas for needed change can be identified during the root-cause search.

The right-to-left search may be repeated for each discrepancy and may end at different root causes. For example, the surveys may reveal that students are seldom engaged in hands-on activities, Area 10. The right-to-left search may extend all the way back to Community Support, Area 3, where it may be determined that the school board has not been financially supportive of elementary science manipulative materials. In the same school, a second search for why students are not engaged in science for a sufficient number of minutes per week may stop at Area 7, where it is found that teachers' plans do not allocate adequate time for science.

A Program Improvement Plan for Elementary Science

Each of the areas of the program environment model that relate to the learning environment in the classroom is elaborated upon in a listing of objectives for program improvement. In this plan, a general statement or two describing a desirable state regarding the area is presented, followed by several specific indicators that the desired state has been reached. Both the statement and indicators are intentionally written in broad terms so that they can be adapted to suit local conditions and standards.

Using the Program Improvement Plan

To make the plan more useful, you will likely want to do several things. First, you may want to set very specific local standards or goals with respect to each indicator. For example, the indicator that ". . . each student is adequately engaged (in science) . . ." would most likely require that "adequately" be defined in terms of a specific number of minutes per week based on State and/or local standards.

Second, you may want to modify, add, or delete indicators and statements. The list of indicators is intended to be only suggestive and not exhaustive. Those included, however, are based on widely held beliefs, current wisdom, and much research about educationally important variables, but this still does not mean that all necessarily apply to your situation or are consistent with experiences in your school setting.

Third, you may want to supplement the data-gathering provided by the State Science Program Environment Surveys. The State surveys have been made brief to encourage their wide use. Consequently, they do not cover all of the areas in the model or provide information on all the indicators in the listings. If local conditions permit, use a more comprehensive and locally tailored set of instruments.

The Program Improvement Plan Features

The Program Improvement Plan consists of statements and indicators for the program environment areas of the *Program Environment Assessment Model*, Areas 3 through 10. Each statement describes a desired program state that should make a positive contribution to student achievement of the desired State syllabus outcomes. The indicators describe specific and potentially observable conditions that help to show that the desired state has been reached.

ELEMENTARY SCIENCE PROGRAM IMPROVEMENT PLAN

Area 3: Community Support

The community has been actively supportive of elementary science program improvement through exhibiting high educational expectations for science, enthusiasm for those who are committed to the program, provision of resources, interest in success levels, and volunteerism.

Indicators:

3.1 Community members have frequently expressed concern for maintaining or improving educational standards in elementary science in the media, at school board meetings, at parent and teacher organization meetings, and through individual conferences with school staff members.

3.2 The elementary science program has been given a high priority by the community, as evidenced by supportive board of education members, and by the board of education, as evidenced by hiring supportive school leaders and faculty who are enthusiastic about teaching science.

3.3 The community and the board of education have supported budgets and requests for expenditures designated for the elementary science program.

3.4 The community and board of education have attended to and expressed concern about test results or other indicators of the effectiveness of the elementary science program.

3.5 The volunteering of time, money, expertise, facilities, and ideas by parents, businesses, organizations, and others for the elementary science program is high.

Area 4: School Science Program Support

School administrators have supported the development and maintenance of the elementary science program through leadership, adequate resources, and coordination.

Indicators:

4.1 A building- or district-level science resource person, mentor, or science supervisor has been designated and has been supported in attending regional and State elementary science syllabus implementation training and in carrying our building-level science program support activities and training.

4.2 The building-level administration has been active in promoting faculty science program development and appropriate staff improvement activities by encouraging faculty commitment to these activities, providing planning and preparation time, supporting dissemination and training, providing building-wide coordination, recognizing good science teaching, monitoring staff improvement, and evaluating program success levels.

4.3 Administrators demonstrate their own enthusiasm for the science program and have made an effort to gain support and commitments from the community, the school board, the school district, parents, and students.

4.4 Administrators have made an effort to insure that science teaching is given adequate attention in the classroom by activities such as monitoring the time devoted to science and the quality of science teaching and supporting field trips and other events.

4.5 Administrators make appropriate science teaching manageable by providing sufficient instructional materials and media, an efficient supply-ordering system, handy and safe storage facilities, and adequate and comfortable teaching space and by supporting the use of outdoor, community, home, and field experiences.

Area 5: School Science Program

The school science program, developed and updated by teachers, accurately translates the State syllabus objectives into more specific local outcomes that provide adequate guidance for teachers in preparing their own lessons in science.

Indicators:

5.1 The school science program was developed with a level of teacher input that insures that all teachers feel that it is their program and is teachable under the conditions that exist in their classrooms.

5.2 The school science program accurately reflects the *New York State Elementary Science Syllabus* by including plans for teaching and monitoring progress on all State objectives designated for each level and by containing guidelines regarding safety procedures.

5.3 The school science program has a degree of specificity that insures that each teacher finds it adequate for planning teaching activities without either excessive duplication from teacher to teacher or inadequate coverage of objectives and that allows room for sufficient individual teacher adaptation and initiative.

5.4 The school science program description is readily available to all teachers in a form that is understandable and interpretable with minimum effort, training, and time.

5.5 Provision exists for periodically reviewing the success of the program and making revisions as needed.

5.6 The school science program makes use of all available resources that could contribute to the accomplishment of the State science objectives.

Area 6: Instructional Technique

The managerial and instructional techniques of the teacher are appropriate for engaging students in learning science as defined by the New York State Elementary Science Syllabus.

Indicators:

6.1 The teacher uses instructional techniques and behaves in a way that shows concern for clarity, attention to and integration of relevant information, and application of what is learned.

6.2 The teacher models and allows students to experience the many facets of scientific inquiry and problem solving including routine, investigative, cooperative, and serious work, as well as inventive, deliberative, independent, and playful activity.

6.3 The teacher, through specific behaviors, conveys the attitude that science is a subject that is interesting, rewarding, and useful in everyday life and that it is a subject that is important to and can be learned by all students.

6.4 The teacher is organized, is in control, is focused, manages the classroom and instructional activities in an efficient manner, makes an effort to involve all students, and maintains a physical and emotional classroom climate in which it is pleasant to work.

6.5 The teacher encourages student effort in science by maintaining high achievement standards, keeping parents and guardians informed, using a fair evaluation and grading system, rewarding student success relative to potential, and providing for public recognition of outstanding science achievement.

Appropriate learning and instructional media are available and are used in a proper way to accomplish the objectives of the New York State Elementary Science Syllabus.

Indicators:

6.6 A variety of learning and instructional materials such as print materials, computer software, manipulatives for hands-on activities, and visual media are readily available to students and the teacher and are frequently and appropriately incorporated in the activities of the classroom.

6.7 Science reading and visual aids, when used in teaching science, are used to reinforce and supplement direct hands-on experience with science phenomena rather than to substitute for those experiences.

6.8 The information conveyed through texts (if used) and other print material is accurate, clearly presented, readable, and consistent with the content, skills, attitudes, and problem-solving objectives of the *New York State Elementary Science Syllabus* at the appropriate level.

Area 7: Instructional Planning

A sufficient amount of quality class time is planned for manageable and motivating lessons, hands-on activities, and media that provide an opportunity to accomplish the objectives of the New York State Elementary Science Syllabus.

Indicators:

7.1 The amount of time allocated to the teaching of each objective is sufficient and is scheduled at a time of day when learning can be accomplished.

7.2 Teaching plans for each level of the State syllabus cover all the syllabus objectives and include opportunities to learn about the roles of women and minorities, safety related to science, and career opportunities in science.

7.3 Teaching activities for each major objective include direct hands-on experience with science phenomena; attention to relevant content, skills, and attitudes; and opportunities to apply these in the solving of science-related problems.

7.4 The selection and design of media, teaching activities, projects, and lessons include attention to students' prior knowledge and experience, abilities, and interests and attention to applicability of science to everyday life, current issues, and problems of student concern.

7.5 Planned activities include assessment of all syllabus-related objectives, collection of feedback, and remediation so that learning problems can be identified and attended to and so that students can be aided in developing accurate perceptions of themselves.

7.6 Teaching plans include methods for evaluating the success of teaching activities and media and use the results of these assessments in subsequent planning.

7.7 Activities are planned that extend learning time and incorporate science in activities outside the school, that is, in the field, home, and community.

7.8 The teaching plans attend to the organization of the classroom, students, and school day so that science instruction, especially hands-on instruction, is manageable under the actual conditions of the classroom and has the potential for being a pleasant experience for all involved.

Area 8: Home Support

Parents or guardians influence, support, and provide feedback for the science program and class science activities.

Indicators:

8.1 Parents show support for class activities by frequently volunteering to tutor, to assist in classroom instruction, to share their expertise with the class, or to provide manipulatives or transportation for field trips.

8.2 Parents attend school functions such as parent nights, science fairs, and parent organization meetings.

The home environment is supportive of the objectives of the science program.

Indicators:

8.3 The home environment includes access to appropriate science reference materials, science television programs, and interactions with others who are knowledgeable in science of interest to this age level.

8.4 Parents or others have aspirations for the child in science, encourage science learning, and reinforce a positive view of the child's science ability.

8.5 The home environment is one in which curiosity, inquiry, creativity, and problem-solving activities are encouraged.

8.6 The values and attitudes of the home that relate to science are compatible with those expressed in the *New York State Elementary Science Syllabus*.

8.7 The home environment includes physical resources that encourage extending school science activities at home; e.g., time and space to do assignments and access to tools, materials, science manipulatives, animals, gardens, natural ecosystems, parks, farms, zoos, or museums.

8.8 The home environment is conducive to the development of good study habits, discipline, routines, schedules, and a sense of responsibility toward schoolwork.

Area 9: Class Potential

Students have characteristics that allow them to handle the instructional and curricular demands placed on them by the science program.

Indicators:

9.1 Students exhibit the experience base, language proficiency, and aptitude needed for meaningful learning in science classes.

9.2 Students exhibit feelings about themselves, including feelings of control, confidence, and self-worth, that allow them to become willing participants in science classes.

9.3 Students exhibit levels of physical, mental, and social health that are adequate for successful completion of science activities.

9.4 Students exhibit positive feelings toward school and learning that are adequate for successful involvement in the science program.

Area 10: Class Engagement

Each student is adequately engaged in school activities that provide an opportunity to learn science-related problem solving and the supporting science content, skills, and attitudes defined by the New York State Elementary Science Syllabus.

Indicators:

10.1 There is an adequate student/teacher ratio, sufficient space in the classroom, access to the out-of-doors, and sufficient materials to promote a favorable affective environment, enabling adequate teacher management of activities, especially those hands-on activities involving manipulatives and problem solving.

10.2 A maximum number of class members are present and involved when science is taught. Absenteeism and pullouts for other student obligations are minimal during this time.

10.3 During science classes, students are focused on science activities and resources that promote syllabus objectives.

10.4 During science classes, managerial activity such as transitions, direction giving, discipline, distribution of materials, and cleanup are carried out efficiently.

10.5 Students are involved outside of class in assigned and voluntary activities that contribute to syllabus objectives.

APPENDIX III

WORKSHEETS

ORGANIZING FOR PROGRAM ANALYSIS

TASK	WHO	WHEN	WHERE	DATE COMPLETED
Determine procedures for scoring, compiling and analyzing data, and developing action plan				
Convene science committee to determine desired responses to optional program environment surveys				
Score test components				
Compile results				
For required components, prepare reports for State Education Department				
Convene science committee to analyze results				
Convene science committee to develop action plan				
Report to board of education (or nonpublic trustees) on program evaluation results and recommended action plan				

OBJECTIVE TEST
WORKSHEET 1

CLASS NO._____

INDIVIDUAL CLASS WORKSHEET
ITEM DIFFICULTY

DIRECTIONS:

1. Record the total number of papers rated in the box.
2. Spread a convenient number of corrected answer sheets (6-10) side by side across a table so that for each answer sheet an entire response column is visible and each row is aligned. Tally the number of incorrect responses for each item.
3. Continue to spread out answer sheets and tally the number of incorrect responses until all answer sheets have been tallied.
4. Determine the number of correct responses for each item and record in the appropriate column.
   (Total number of papers rated - total number of incorrect responses)
5. Transfer the number of correct responses for each item to Objective Test Worksheet 2.

NO. PAPERS RATED: ☐

ITEM NO.	TOTAL NO. OF INCORRECT RESPONSES	TOTAL NO. OF CORRECT RESPONSES	ITEM NO.	TOTAL NO. OF INCORRECT RESPONSES	TOTAL NO. OF CORRECT RESPONSES
1			24		
2			25		
3			26		
4			27		
5			28		
6			29		
7			30		
8			31		
9			32		
10			33		
11			34		
12			35		
13			36		
14			37		
15			38		
16			39		
17			40		
18			41		
19			42		
20			43		
21			44		
22			45		
23					

OBJECTIVE TEST WORKSHEET 2

BUILDING/DISTRICT NAME _____

BUILDING OR DISTRICT WORKSHEET
ITEM DIFFICULTY

DIRECTIONS:

1. From Objective Test Worksheet 1 for each class, record the number of students who took the Objective Test and the number of correct responses for each item.
2. Total the vertical columns for the number of students and for each item.
3. For each item, determine the item difficulty as a percentage.
   [(Total number of correct responses ÷ total number of students) × 100]
4. Transfer the item difficulties to Objective Test Worksheet 3.

CLASS	NO. OF STUDENTS	FOR EACH TEST ITEM, NUMBER OF CORRECT RESPONSES																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
TOTAL																								
ITEM DIFFICULTY																								

CLASS	NO. OF STUDENTS	FOR EACH TEST ITEM, NUMBER OF CORRECT RESPONSES																						
		24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	
1																								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
TOTAL																								
ITEM DIFFICULTY																								

OBJECTIVE TEST
WORKSHEET 3

BUILDING/DISTRICT NAME _____

SUMMARY SHEET
ITEM DIFFICULTY

DIRECTIONS:

1. From Objective Test Worksheet 2, record the item difficulty for each item in the local difficulty column.
2. Put a box around each local item difficulty that is at or below the lower group of the State item difficulty.
3. Circle each local item difficulty that is below the State overall group item difficulty.

[OVER]

WORKSHEET 3

ITEM NO.	SYLLABUS REFERENCE	LOCAL DIFFICULTY	STATE DIFFICULTY		
			LOWER GROUP	TOTAL	UPPER GROUP
1	IA2.11		88	93	98
2	IAI.3		51	64	78
3	IA1.12		40	47	54
4	IA2.16		51	64	77
5	IA2.2		57	70	84
6	IA2.3		72	82	92
7	IA2.41		34	47	60
8	IA2.6		33	40	48
9	IB2		44	66	87
10	IC1.11		66	75	85
11	IC1.3		66	78	91
12	IC2.5		42	57	71
13	ID1		81	89	97
14	ID2.2		57	72	88
15	IIA1.21		32	40	48
16	ID3.12		22	36	51
17	ID3.2		49	59	69
18	ID1.2		60	73	85
19	IIA1.22		24	42	60
20	IIA1.23		67	79	91
21	IIA2.41		24	36	48
22	IIA2.1		67	80	93
23	IIB1.1		32	46	60
24	IIB1		59	74	89
25	IIB1.2		33	46	59
26	IIB2.1		25	41	56
27	IIC2.2		52	67	82
28	IIC1.12		31	43	56
29	IIB2.1		51	68	85
30	Classifying - I		80	87	94
31	Measuring - I		30	52	73
32	Interp Data - I		77	87	96
33	Interp Data - I		39	57	75
34	Using Numbers - I		44	63	82
35	Observing - I		60	75	90
36	Measuring - I		86	92	98
37	Using Cues - II		69	81	94
38	Using Numbers - II		57	69	80
39	Measuring - II		49	65	81
40	Dev Vocab - II		38	56	74
41	Ident Var - II		36	49	61
42	Rec Data - II		37	59	81
43	Rec Data - II		30	45	60
44	Questioning - II		24	45	66
45	Interp Data - II		35	54	73

OBJECTIVE TEST
WORKSHEET 4

BUILDING/DISTRICT NAME _____

SUMMARY SHEET
TEST PART DIFFICULTY

DIRECTIONS:

1. From Objective Test Worksheet 3, total the local difficulty of the items in each test part and place in the total column.
2. Determine the local average difficulty for each part of the Objective Test.
   (Total ÷ number of items in the part)
3. Put a box around each average difficulty that is at or below the State lower group average difficulty.
4. Circle each average difficulty that is below the State overall group average difficulty.

TEST PART (ITEM NOS.)	TOTAL	DIVIDE BY	LOCAL AVERAGE DIFFICULTY	STATE AVERAGE DIFFICULTY		
				LOWER GROUP	OVERALL GROUP	UPPER GROUP
LEVEL I CONTENT (1–14,16–18)		17		54	65	77
LEVEL II CONTENT (15,19–29)		12		41	55	69
LEVEL I SKILLS (30–36)		7		59	73	87
LEVEL II SKILLS (37–45)		9		42	58	74
TOTAL (1–45)		45		49	62	76

MANIPULATIVE SKILLS TEST **CLASS NO._____**
WORKSHEET 1

INDIVIDUAL CLASS SCORING WORKSHEET

DIRECTIONS:

1. Score each student answer sheet.
2. From each answer sheet, record each item score in the appropriate column.
3. Total each row to determine each student's score.
4. Total each vertical item column to determine the total score for each item.
5. Enter the total number of students who took the test in the student column.
6. Transfer the number of students and each total item score to Manipulative Skills Test Worksheet 2.

	Station 1				Station 2			Station 3		Station 4		Station 5				STUDENT SCORE
ITEMS*	2	3	4	5	1	2	3	1	2	2	3	1	2	3	5	
Maximum Value	[1]	[1]	[1]	[1]	[3]	[1]	[1]	[2]	[2]	[3]	[2]	[1]	[1]	[1]	[1]	[22]
Student																
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
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20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
TOTAL																

*Nonscored items are Station 1, Item 1; Station 4, Item 1; and Station 5, Item 4.

MANIPULATIVE SKILLS TEST **BUILDING/DISTRICT NAME** _____
WORKSHEET 2

BUILDING OR DISTRICT WORKSHEET
ITEM DIFFICULTY

DIRECTIONS:

1. From Manipulative Skills Test Worksheet 1 for each class, record the total number of students and each total item score.
2. Total each vertical column to determine the total number of students and the total of item scores.
3. Determine the mean item score for each item.
   (Total score for each item ÷ total number of students)
4. Convert the mean item score for each item to an item difficulty.
   [(Mean item score ÷ maximum value of item) × 100]
6. Transfer each item difficulty to Manipulative Skills Test Worksheet 3.

		FOR EACH ITEM, TOTAL ITEM SCORES																
STATION		1					2			3		4		5				
ITEMS		2	3	4	5		1	2	3	1	2	2	3	1	2	3	5	
CLASS	NUMBER OF STUDENTS																	
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
TOTAL																		
MEAN ITEM SCORE																		
ITEM VALUE		[1]	[1]	[1]	[1]		[3]	[1]	[1]	[2]	[2]	[3]	[2]	[1]	[1]	[1]	[1]	
ITEM DIFFICULTY																		

MANIPULATIVE SKILLS TEST **BUILDING/DISTRICT NAME** _____
WORKSHEET 3

SUMMARY SHEET
ITEM DIFFICULTY

DIRECTIONS:

1. From Manipulative Skills Test Worksheet 2, record the item difficulty for each item in the local difficulty column.
2. Put a box around each local difficulty that is at or below the State lower group item difficulty.
3. Circle each local difficulty that is below the State overall group item difficulty.

STATION	ITEM NO.	SYLLABUS REFERENCE	LOCAL DIFFICULTY	STATE ITEM DIFFICULTY		
				LOWER GROUP	OVERALL GROUP	UPPER GROUP
1	2	MEASURING MASS		40	62	82
	3	MEASURING LENGTH		61	72	84
	4	MEASURING VOLUME		29	46	65
	5	MEASURING TEMPERATURE		76	83	90
2	1	OBSERVING		66	79	93
	2	PREDICTING		36	58	80
	3	INTERPRETING DATA		19	39	57
3	1	CLASSIFYING		54	66	84
	2	CLASSIFYING		46	60	78
4	2	MANIPULATING MATERIALS		81	87	92
	3	GENERALIZING		---	46 †	---
5	1	INFERRING		21	35	49
	2	INFERRING		54	62	75
	3	INFERRING		28	38	49
	5	INTERPRETING DATA		---	74 †	---

†This difficulty is based on a re-pretested sample of 78 students. The values for the lower and upper groups are not available.

STUDENT SCIENCE ATTITUDES SURVEY **CLASS NO._____**
WORKSHEET 1

INDIVIDUAL CLASS WORKSHEET

DIRECTIONS:

1. Record the total number of completed student surveys in the box.
2. Review each student answer sheet, marking all responses that do not correspond to the State-defined desired response for that item. This includes "Don't Understand" responses.
3. Spread a convenient number of answer sheets (6-10) side by side across a table so that for each answer sheet the entire response column is visible and the rows are aligned. For each item, tally the number of responses not matching the desired response.
4. Continue to spread out answer sheets and tally the number of responses not matching the desired response until all answer sheets have been tallied.
5. In the last column, record the total number of responses not matching the desired response for each item.
6. Transfer the number of completed surveys and the number of students not matching the desired response for each item to Student Science Attitudes Survey Worksheet 2.

TOTAL NO. OF COMPLETED STUDENT SURVEYS

ITEM NO.	SYLLABUS REFERENCE	STATE-DEFINED DESIRED RESPONSE	NO. OF RESPONSES NOT MATCHING DESIRED RESPONSE
1	A1.11	A	
2	A1.22	C	
3	A1.23	C	
4	A2.13	A	
5	A2.13	C	
6	A2.23	C	
7	A2.26	A	
8	B1.2	A	
9	B2.2	A	
10	B2.3	A	
11	A1.12	A	
12	A1.31	A	
13	A2.11	C	
14	A2.12	A	
15	A2.15	A	
16	A2.21	A	
17	A2.22	A	
18	A2.25	C	
19	B1.1	A	
20	B2.1	A	

STUDENT SCIENCE ATTITUDES SURVEY **BUILDING/DISTRICT NAME**_____
WORKSHEET 2

SUMMARY SHEET

DIRECTIONS:

1. From Student Science Attitudes Survey Worksheet 1 for each class, record the number of completed surveys and the number of responses not matching the State-defined desired response for each item.
2. Total the vertical column for the number of completed surveys and for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Transfer each item discrepancy to the correct box on the Summary Chart at the bottom.
5. Determine the average discrepancy for each attitude area by completing the Summary Chart.
6. Circle each discrepancy on both charts that is greater than 35 (more than 35% of the student responses do not correspond with the desired response).

CLASS	NO. OF COMPLETED SURVEYS	FOR EACH ITEM, NO. OF RESPONSES NOT MATCHING DESIRED RESPONSE																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
TOTAL																					
ITEM DISCREPANCY																					

SUMMARY CHART BY ATTITUDE AREA

ATTITUDE AREA		ITEM NUMBERS/DISCREPANCY										TOTAL DISC.	DIVIDED BY	AVERAGE DISC.
UNDERSTANDING NATURAL WORLD	A1	1	2	3	11	12							5	
INVESTIGATIVE METHODS	A2	4	5	6	7	13	14	15	16	17	18		10	
VALUING KNOWLEDGE	B	8	9	10	19	20							5	

STUDENT PROGRAM ENVIRONMENT SURVEY **CLASS NO._____**
WORKSHEET 1

INDIVIDUAL CLASS WORKSHEET

DIRECTIONS:

1. Record the desired local response for each item in the appropriate column.
2. Record the total number of completed student surveys in the box.
3. Review each student answer sheet, marking all responses that do not match the desired response for that item, including "Don't Understand" responses.
4. Spread a convenient number of answer sheets (6-10) side by side across a table so that the entire response column is visible for each answer sheet and each row is aligned. Tally the number of responses not matching the desired response for each item.
5. Continue to spread out answer sheets and tally the number of responses not matching the desired response until all answer sheets have been tallied.
6. In the appropriate column, record the number of responses not matching the desired response for each item.
7. Transfer the number of completed surveys and the number of responses not matching the desired response for each item to Student Program Environment Survey Worksheet 2.

TOTAL NO. OF COMPLETED SURVEYS: ☐

ITEM NO.	PROGRAM ENVIRON-MENT REFERENCE	LOCALLY DETERMINED DESIRED RESPONSE	NO.RESPONSES NOT MATCHING DESIRED RESPONSE	ITEM NO.	PROGRAM ENVIRON-MENT REFERENCE	LOCALLY DETERMINED DESIRED RESPONSE	NO.RESPONSES NOT MATCHING DESIRED RESPONSE
1	Instr. Planning 7.1			14	Instr. Tech. 6.5		
2	Instr. Planning 7.5			15	Instr. Tech. 6.3		
3	Instr. Planning 7.2			16	Instr. Tech. 6.5		
4	Instr. Planning 7.7			17	Instr. Tech. 6.2		
5	Instr. Planning 7.3			18	Instr. Tech. 6.6		
6	Instr. Planning 7.4			19	Instr. Tech. 6.6		
7	Instr. Planning 7.7			20	Instr. Tech. 6.4		
8	Instr. Planning 7.7			21	Instr. Tech. 6.5		
9	Instr. Tech. 6.2			22	Instr. Tech. 6.6		
10	Instr. Tech. 6.6			23	Instr. Tech. 6.6		
11	Instr. Tech. 6.6			24	Instr. Tech. 6.5		
12	Instr. Tech. 6.3			25	Comm./Home Support 8.3		
13	Instr. Tech. 6.2						

STUDENT PROGRAM ENVIRONMENT SURVEY WORKSHEET 2

BUILDING/DISTRICT NAME_____

SUMMARY SHEET

DIRECTIONS:

1. From Student Program Environment Survey Worksheet 1 for each class, record the number of completed surveys and the number of students not matching the desired response for each item.
2. Total the vertical column for the number of completed surveys and for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Subtotal the item discrepancies for each program environment area.
5. Circle each discrepancy that is greater than 35 (more than 35% of the student responses do not match the desired response).
6. Transfer the subtotals to Program Environment Worksheet 7.

CLASS	NO. OF SURVEYS	FOR EACH ITEM, NO. OF RESPONSES NOT MATCHING DESIRED RESPONSE																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1																										
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
TOTAL																										
ITEM DISCREPANCY																										
ITEM NOS.								1–8																9–24		25
SUBTOTAL																										

ADMINISTRATOR PROGRAM ENVIRONMENT SURVEY WORKSHEET 3

BUILDING/DISTRICT NAME_____

BUILDING OR DISTRICT WORKSHEET

DIRECTIONS:

1. Record the desired local response for each item in the appropriate column.
2. Record the number of completed administrator surveys and the number of responses not matching the desired response for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Subtotal the item discrepancies for each program environment area.
5. Circle each item discrepancy that is greater than 35.
6. Transfer the subtotals to Program Environment Worksheet 7.

TOTAL NO. OF COMPLETED SURVEYS ☐

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	DESIRED RESPONSE	NO. NOT MATCHING DESIRED RESPONSE	ITEM DISC.
1	Sch.Sci.Prg. 5.4			
2	Sch.Sci.Prg. 5.2			
3	Sch.Sci.Prg. 5.2			
4	Sch.Sci.Prg. 5.1			
5	Sch.Sci.Prg. 5.5			
	SUBTOTAL 1–5			
6	Prg. Support 4.1			
7	Prg. Support 4.2			
8	Prg. Support 4.5			
9	Prg. Support 4.5			
10	Prg. Support 4.2			
11	Prg. Support 4.2			
12	Prg. Support 4.5			
13	Prg. Support 4.5			
14	Prg. Support 4.2			
15	Prg. Support 4.2			
16	Prg. Support 4.3			
	SUBTOTAL 6–16			

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	DESIRED RESPONSE	NO. NOT MATCHING DESIRED RESPONSE	ITEM DISC.
17	Instr. Plan. 7.1			
18	Instr. Plan. 7.2			
19	Instr. Plan. 7.3			
20	Instr. Plan. 7.2			
21	Instr. Plan. 7.2			
22	Instr. Plan. 7.3			
23	Instr. Plan. 7.7			
24	Instr. Plan. 7.5			
25	Instr. Plan. 7.5			
26	Instr. Plan. 7.5			
27	Instr. Plan. 7.3			
28	Instr. Plan. 7.7			
29	Instr. Plan. 7.7			
	SUBTOTAL 17–29			
30	Instr. Tech. 6.6			
31	Instr. Tech. 6.5			
32	Instr. Tech. 6.5			
	SUBTOTAL 30–32			

TEACHER PROGRAM ENVIRONMENT SURVEY
WORKSHEET 4

BUILDING/DISTRICT NAME_____

BUILDING OR DISTRICT WORKSHEET

DIRECTIONS:

1. Record the desired local response for each item in the appropriate column.
2. Record the number of completed teacher surveys and the number of responses not matching the desired response for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Subtotal the item discrepancies for each program environment area.
5. Circle each discrepancy that is greater than 35.
6. Transfer the subtotals to Program Environment Worksheet 7.

TOTAL NO. OF COMPLETED SURVEYS ☐

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	DESIRED RESPONSE	NO. NOT MATCHING DESIRED RESPONSE	ITEM DISC.
1	Sch.Sci.Prg. 5.4			
2	Sch.Sci.Prg. 5.2			
3	Sch.Sci.Prg. 5.2			
4	Sch.Sci.Prg. 5.1			
5	Sch.Sci.Prg. 5.5			
			SUBTOTAL 1–5	
6	Prg. Supp. 4.1			
7	Prg. Supp. 4.5			
8	Prg. Supp. 4.2			
9	Prg. Supp. 4.2			
10	Prg. Supp. 4.2			
11	Prg. Supp. 4.5			
12	Prg. Supp. 4.2			
13	Prg. Supp. 4.5			
14	Prg. Supp. 4.5			
15	Prg. Supp. 4.5			
16	Prg. Supp. 4.5			
17	Prg. Supp. 4.5			
18	Prg. Supp. 4.5			
19	Prg. Supp. 4.2			
20	Prg. Supp. 4.2			
			SUBTOTAL 6–20	

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	DESIRED RESPONSE	NO. NOT MATCHING DESIRED RESPONSE	ITEM DISC.
21	Instr. Plan. 7.1			
22	Instr. Plan. 7.2			
23	Instr. Plan. 7.3			
24	Instr. Plan. 7.2			
25	Instr. Plan. 7.3			
26	Instr. Plan. 7.7			
27	Instr. Plan. 7.5			
28	Instr. Plan. 7.6			
29	Instr. Plan. 7.3			
30	Instr. Plan. 7.7			
			SUBTOTAL 21–30	
31	Instr. Tech. 6.4			
32	Instr. Tech. 6.4			
33	Instr. Tech. 6.5			
34	Instr. Tech. 6.6			
35	Instr. Tech. 6.5			
36	Instr. Tech. 6.5			
			SUBTOTAL 31–36	

PARENT/GUARDIAN PROGRAM ENVIRONMENT SURVEY CLASS NO._____
WORKSHEET 5

INDIVIDUAL CLASS WORKSHEET

DIRECTIONS:

1. Record the desired local response for each item in the appropriate column.
2. Record the number of parent/guardian surveys sent, the number returned, and the percent returned in the boxes.
3. Review each parent/guardian survey, marking all responses that do not correspond to the desired response for that item, including "Don't Know" responses.
4. Spread a convenient number of survey sheets (6-10) side by side across a table so that for each survey sheet an entire response column is visible and each row is aligned. Tally the number of responses not matching the desired response for each item.
5. Continue to spread out survey sheets and tally the number of responses not matching the desired survey sheets response until all survey sheets have been tallied.
6. In the last column, record the number of responses not matching the desired response for each item.
7. Transfer the number of returned surveys and the number of responses not matching the desired response for each item to Parent/Guardian Program Environment Survey Worksheet 6.

NO.OF SURVEYS SENT

NO.OF SURVEYS RETURNED

PERCENT OF SURVEYS RETURNED

ITEM NO.	PROGRAM ENVIRONMENT REFERENCE	LOCALLY DETERMINED DESIRED RESPONSE	NO. RESPONSES NOT MATCHING DESIRED RESPONSE
1	Sch. Sci. Prg. 5.1		
2	Instr. Planning 7.4		
3	Instr. Planning 7.3		
4	Instr. Planning 7.8		
5	Instr. Planning 7.8		
6	Instr. Tech. 6.6		
7	Instr. Tech. 6.2		
8	Instr. Tech. 6.6		
9	Instr. Tech. 6.5		
10	Instr. Tech. 6.5		
11	Comm./Home Support 8.3		
12	Comm./Home Support 8.3		

PARENT/GUARDIAN PROGRAM ENVIRONMENT SURVEY
WORKSHEET 6

BUILDING/DISTRICT NAME_____

SUMMARY SHEET

DIRECTIONS:

1. From Parent/Guardian Program Environment Survey Worksheet 5 for each class, record the number of returned surveys and the number of responses not matching the desired response for each item.
2. Total the vertical column for the number of surveys and for each item.
3. Determine the item discrepancy for each item.
   [(Total no. of responses not matching the desired response ÷ total no. of completed surveys) × 100]
4. Subtotal the item discrepancies for each program environment area.
5. Circle each discrepancy that is greater than 35.
6. Transfer the subtotals to Program Environment Worksheet 7.

CLASS	NO. OF SURVEYS	FOR EACH ITEM, NO. OF RESPONSES NOT MATCHING DESIRED RESPONSE											
		1	2	3	4	5	6	7	8	9	10	11	12
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
TOTAL													
ITEM DISCREPANCY													
ITEM NOS.		1				2–5				6–10		11–12	
SUBTOTAL													

PROGRAM ENVIRONMENT
WORKSHEET 7

BUILDING/DISTRICT NAME_____

SUMMARY SHEET

DIRECTIONS:

1. From each program environment survey summary sheet (Worksheets 2, 3, 4, and 6), record the item subtotals in the appropriate spaces.
2. To determine the average discrepancy for each program area by group surveyed, complete the horizontal rows in the first five charts.
3. To determine the overall average discrepancy for each program area, complete the vertical "Subtotal" column and the "Total" horizontal row in each of the first five charts. For easy reference, transfer the overall average discrepancy to the last chart.
4. Circle each discrepancy that is greater than 35.

SCHOOL SCIENCE PROGRAM

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT				
ADMINISTRATOR	1–5		5	
TEACHER	1–5		5	
PARENT/GUARD.	1		1	
TOTAL			11	

SCIENCE PROGRAM SUPPORT

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT				
ADMINISTRATOR	6–16		11	
TEACHER	6–20		15	
PARENT/GUARD.				
TOTAL			26	

INSTRUCTIONAL PLANNING

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT	1–8		8	
ADMINISTRATOR	17–29		13	
TEACHER	21–30		10	
PARENT/GUARD.	2–5		4	
TOTAL			35	

INSTRUCTIONAL TECHNIQUE

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT	9–24		16	
ADMINISTRATOR	30–32		3	
TEACHER	31–36		6	
PARENT/GUARD.	6–10		5	
TOTAL			30	

COMMUNITY/HOME SUPPORT

SURVEY	ITEM NOS.	SUB-TOTAL	DIVIDE BY	AVER. DISC.
STUDENT	25		1	
ADMINISTRATOR				
TEACHER				
PARENT/GUARD.	11–12		2	
TOTAL			3	

SUMMARY BY PROGRAM ENVIRONMENT AREA

PROGRAM ENVIRONMENT REFERENCE	OVER-ALL DISC.
SCHOOL SCIENCE PROGRAM	
SCIENCE PROGRAM SUPPORT	
INSTRUCTIONAL PLANNING	
INSTRUCTIONAL TECHNIQUE	
COMMUNITY/HOME SUPPORT	

ELEMENTARY SCIENCE
PROGRAM WEAKNESSES WORKSHEET

OBJECTIVE TEST

AREAS OF WEAKNESS	SYLLABUS REFERENCE FOR INDIVIDUAL ITEMS
☐	
○	

MANIPULATIVE SKILLS TEST

AREAS OF WEAKNESS

☐

○

SCIENCE ATTITUDES SURVEY

AREAS OF WEAKNESS	SYLLABUS REFERENCE FOR INDIVIDUAL ITEMS
○	

PROGRAM ENVIRONMENT SURVEYS

AREAS OF WEAKNESS	POSSIBLE CAUSES OF POOR PERFORMANCE
○	

ELEMENTARY SCIENCE
PROGRAM STRENGTHS WORKSHEET

OBJECTIVE TEST
AREAS OF STRENGTH

MANIPULATIVE SKILLS TEST
AREAS OF STRENGTH

SCIENCE ATTITUDES SURVEY
AREAS OF STRENGTH

PROGRAM ENVIRONMENT SURVEYS
AREAS OF STRENGTH

ACTION PLAN
FOR PROGRAM IMPROVEMENT

PROGRAM WEAKNESS	CORRECTIVE ACTION	TIME LINE	PERSON(S) RESPON-SIBLE	RESOURCES NEEDED	SUCCESS MEASURED BY

New York State Education Department
Albany, New York 12234

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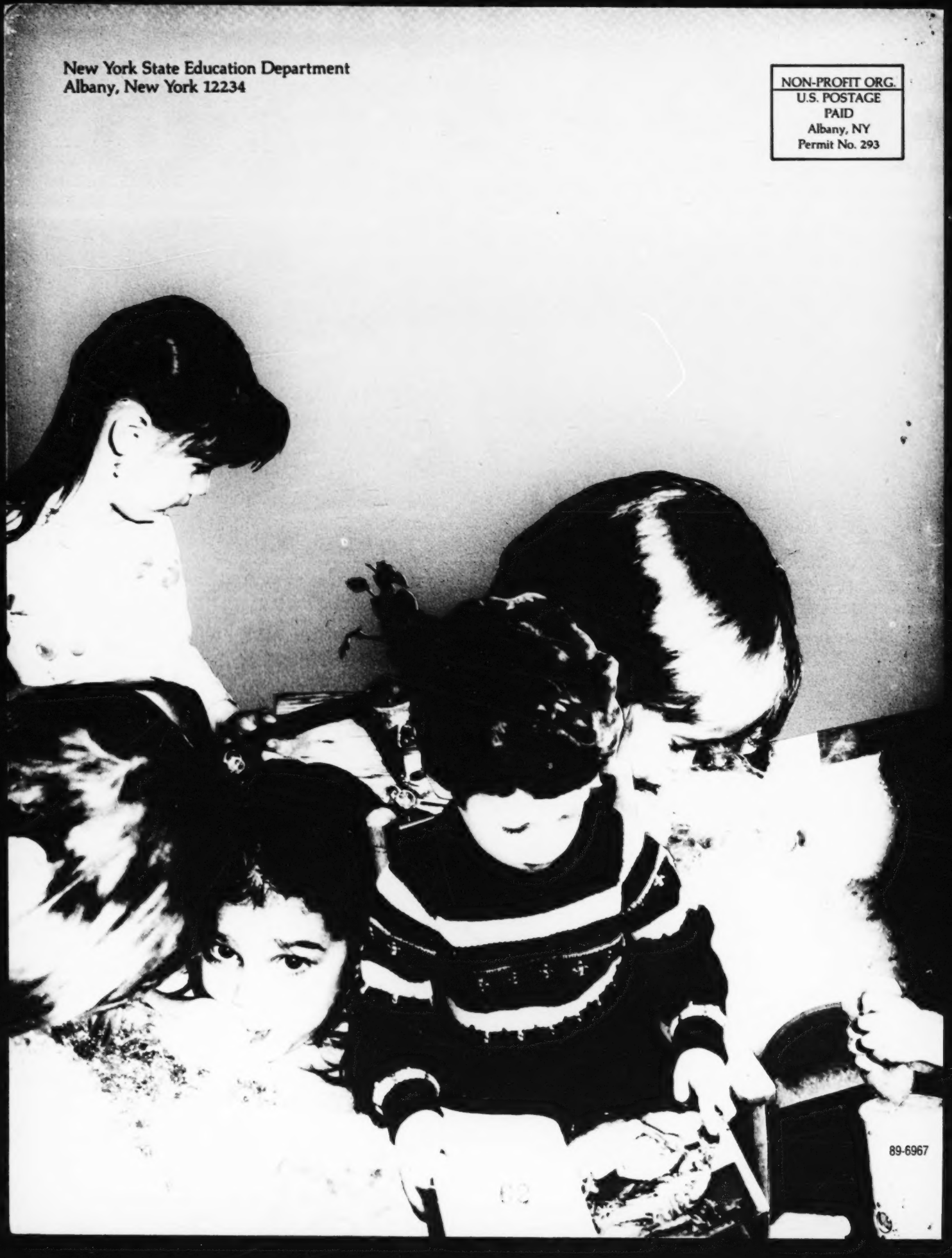

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